Global Discovery

DEA ATR-42 Integration

Earned Value Management Assessment

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Irregular Warfare Technologies Division
Joint Special Operations Response Department
NSWC Crane

(b)(6)

Overview

- **Earned Value Management (EVM)**
  - **Basic Concepts**
  - **Terminology**
  - **Benefits**
  - **Limitations**
- **GD DEA Assessment**
  - **Baseline Scenarios**
  - **Assessment of EVM Indices**
- **Summary**

Basic Concepts

- **EVM is a Project Management System that combines Schedule and Cost Performance.**
  - **Answers the question "What did we get for the money that was spent?**
- **All Project Steps "Earn" Value as Work is Completed**
- **Earned Value (EV) can be compared to actual and planned costs.**
  - **Determine project performance**
  - **Predict future performance trends**
- **Progress is measured in dollars so schedule and cost performance can be analyzed in the same terms.**

Terminology

- **Budgeted Cost of Work Performed (BCWP)**
  - Measure of how much was budgeted for the amount of work that has been performed.
- **Actual Cost of Work Performed (ACWP)**
  - Total costs actually incurred and recorded in accomplishing work performed during a given time period for a schedule activity.
- **Budgeted Cost of Work Scheduled (BCWS)**
  - Budgeted costs for all planned work scheduled to be completed to-date.
- **Cost Variance (CV)**
  - Difference between work accomplished (in dollars) and how much was spent to accomplish it.
- **Schedule Variance (SV)**
  - Difference between what was planned to be completed and what actually has been completed.

Terminology (cont.)

- **Estimate at Completion (EAC)**
  - **Forecast of total costs that will be accrued by project completion based on past cost performance trends.**
- **Budget at Completion (BAC)**
  - **Overall approved budget for the project.**
- **Variance at Completion (VAC)**
  - **The difference between the new EAC and the original BAC.**
- **Schedule Performance Index (SPI)**
  - **Schedule variance related as a ratio instead of a dollar amount. A ratio less than 1 indicates that the work is being completed slower than planned.**
- **Cost Performance Index (CPI)**
  - **Cost variance related as a ratio instead of a dollar amount. A ratio less than 1 indicates that the work value accomplished is less than the amount of money spent.**

Terminology (cont.)

- **To Complete Schedule Performance Indicator (TSPI)**
  - **An index showing the efficiency at which the remaining project time should be utilized.**
    - **A ratio less than 1 indicates the project team needs to work harder in utilizing the remaining time allocated to the project.**

- **To Complete Cost Performance Indicator (TCPI)**
  - **An index showing the efficiency of the resource utilization on the project.**
    - **A ratio less than 1 indicates project team utilization for the remainder of the project should be lenient.**

Benefits

- **EVM integrates Work, Schedule and Cost utilizing a Work Breakdown Structure (WBS).**
- **Cost Performance Index (CPI) and Schedule Performance Index (SPI) can be used as early warning signals.**
- **Estimated Actual Costs (EAC) and CPI can be a predictor of the final cost of the Project.**
- **Indices can be monitored at detailed levels of the WBS.**
  - **Analysis and metrics can be tracked at the frequency and level needed by management for effective control.**

Limitations

- **EVM has no Provision to Measure Project Quality.**
  - **Project may be under budget, ahead of schedule, and meets requirements but can still result in unsuccessful results.**
- **EVM is not intended for Level of Effort (LOE) projects.**
  - **Mix of LOE and discrete tasking may result in contaminated EVM results.**
- **EVM is not applicable to discovery-driven development projects.**
  - **Not always possible to plan research projects far in advance.**
    - **Uncovers some opportunities to pursues and actively eliminates others.**
  - **Not conducive to measuring technical performance objectively.**

Earn Value Management (EVM) Assessment DEA Scenarios

- Assessment Approach
  - **EVM Analysis Performed by Measuring Actual Progress and Performance Against CO3A Spend Plans (Baseline and Current)**
- Baseline Scenario:
  - **Based off Spend Plan Resulting from Approval in December 2010 for DEA COA-3A Configuration Baseline**
- Current Scenario:
  - **Based off Current COA-3A Spend Plan:**
    - **Acquisition Delay Due to MOA Signature Requirement**
    - **Updates to Acquisition and Contracting Amounts due to:**
      - ✓ **Refinement of acquisition numbers (New pricing and solidified acquisition requirements)**
      - ✓ **Additional ODC requirements for Summit Aviation/Delta Engineering team**
      - ✓ **Direct CITE funding required for non-CTC contract support**

Earn Value Management (EVM) Assessment
Schedule Performance Index (SPI)

- Baseline:
  - **An overall SPI of .64 indicates that the project is 36% behind the planned work estimated in the original spend plan. Some conclusions resulting from the assessment include the following:**
    - **Delay in start up of teams and subs limited overall progress to baseline schedule.**
    - **Lack of procurement led to a slip in the integration and development effort** (SPI for R&D of 0.55; for Acquisition 0.51)
    - **Focus has been on documentation/software development and meeting acquisition milestones**
- Current:
  - **For current spend plan SPI rose minimally to 0.68.**
    - **Major driver is the inability to procure.**
      - ✓ **ERP does not allow much flexibility in moving the schedule to the right unless other acquisition options are pursued (will involve additional pass through costs)**

Earn Value Management (EVM) Assessment
Cost Performance Index (CPI)

- Baseline:
  - **CPI of 0.91 indicates that the project is over the original planned budget by 9%. Some conclusions resulting from the assessment include the following:**
    - **The Project Management costs is being over expended by 32%. Not unusual for the startup of a new project.**
    - **Research & Discovery costs are slightly over expended relevant to the plan (SPI of 0.87). Concern due to SPI at 0.55 work being performed.**
    - **Reinforces the focus and effectiveness of System Engineering, Logistics, and Software Development (CPIs greater than 1.4)**
- Current:
  - **CPI rose to 0.97 due to increase in Acquisition budget and lack of expenditures. No new conclusions can be drawn from the numbers.**

Earn Value Management (EVM) Assessment
TSPI and TCPI

TSPI

Baseline and Current Scenarios:

- **Total project TSPIs for both scenarios are over 1.0 (1.14 and 1.09) which indicate that the future variances between the spend plans and actual work can be corrected with minimal effort**

TCPI

Baseline and Current Scenarios:

- **Total project TCPIs for both scenarios are approximately 1.0 (1.01 and 1.02) which indicate that the future cost variances between the spend plans and actual expenditures will close to zero on the completion of the project.**
- **Assumption here is that once procurement is started the expenditure costs will align with the original budget.**

Summary

- **EVM is an Effective Quantitative Tool for Accessing Project and Cost Performance**
  - **Can be a good indicator in predicting future performance and expenditure rates**
- **EVM Requires that the Project be Decomposed, Broken Down into Major Tasks, and Planned and Scheduled to Detailed Work Packages**
- **EVM Indices Should not be Taken at Face Value**
  - **Outliers, scope creep, and level of effort (LOE) work can corrupt the analysis**
- **EVM Assessment of GD DEA for Baseline and Current COA-3A Scenarios Indicate the Following:**
  - **GD is behind schedule due to procurement being delayed**
  - **Overall expenditures are in alignment with spend plan but do not necessarily coincide with WBS elements**
    - **Procurement, system engineering, logistics under executing**
    - **Aircraft integration and program management over executing**
  - **Future Trend Indices (TSPI and TCPI) Indicate that Performance and Expenditure Rates can be Effectively Managed With Minimal Course Correction.**
    - **Indicate that expenditures will align with the original budget once procurements are initiated.**